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White Bluffs Pickling Acid Cribs Expedited Response Action Proposal

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United States
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CONTENTS

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) recommended in a letter dated March 4, 1992 (Attachment 1) that the U.S. Department of Energy (DOE) prepare an expedited response action (ERA) for the White Bluffs Pickling Acid Cribs Site (Location, Figure 1). The lead regulatory agency for this ERA is the EPA, with Ecology providing support. The ERA will follow applicable sections of 40 CFR 300, Subpart E (EPA 1990); the *Hanford Federal Facility Agreement and Consent Order* (Part 3, Article XIII, Section 38) (Ecology et al. 1989); the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA); the *Resource Conservation and Recovery Act of 1976* (RCRA); and the State of Washington *Model Toxics Control Act* (MTCA).

The goal of this ERA is to reduce the potential of any residual contaminant migration from the cribs to the soil column and groundwater. The cribs are the only waste site within the 100-IU-5 operable unit (Figure 2). Since the operable unit is surrounded by other waste units, tracing the potential groundwater contamination from the 100-IU-5 operable unit for this ERA would not be effective. Groundwater will be investigated with the 100-IU-2 operable unit.

This ERA proposal presents the characterization data from the site investigations conducted in November of 1992. This information is evaluated to present the best method for reducing potential of contaminant migration from the disposal unit, ensuring both protection of human health and the environment.

The ERA proposal will undergo a public review. EPA and Ecology will issue an Action Agreement Memorandum after comment resolution. This Action Memorandum may authorize implementation of the ERA proposal's recommended alternative. The ERA may also provide a No Further Action Interim Record of Decision (IROD) of the 100-IU-5 operable unit.

2.0 SITE DESCRIPTION

2.1 LOCATION AND PHYSICAL DESCRIPTION

The White Bluffs Pickling Acid Cribs Site is the only waste site identified in the 100-IU-5 operable unit. It is located south of the White Bluffs Town Site, in the 600 Area of the Hanford Site. The White Bluffs Area was the location of construction activities during the early days at Hanford. After construction, most of the facilities at the White Bluffs site were torn down. Other than the historical information obtained in the Hanford Site Waste Management Unit Reports (DOE-RL 1992), little is known about activities conducted at the site in its early years. It is believed that the cribs received waste streams (primarily acid etch solutions) from a pipe fabrication facility operating sometime between 1943 and 1959. The pipe fabrication facility is suspected to have been located northeast of the cribs.

Figure 1. Location of the White Bluffs Pickling Acid Cribs.

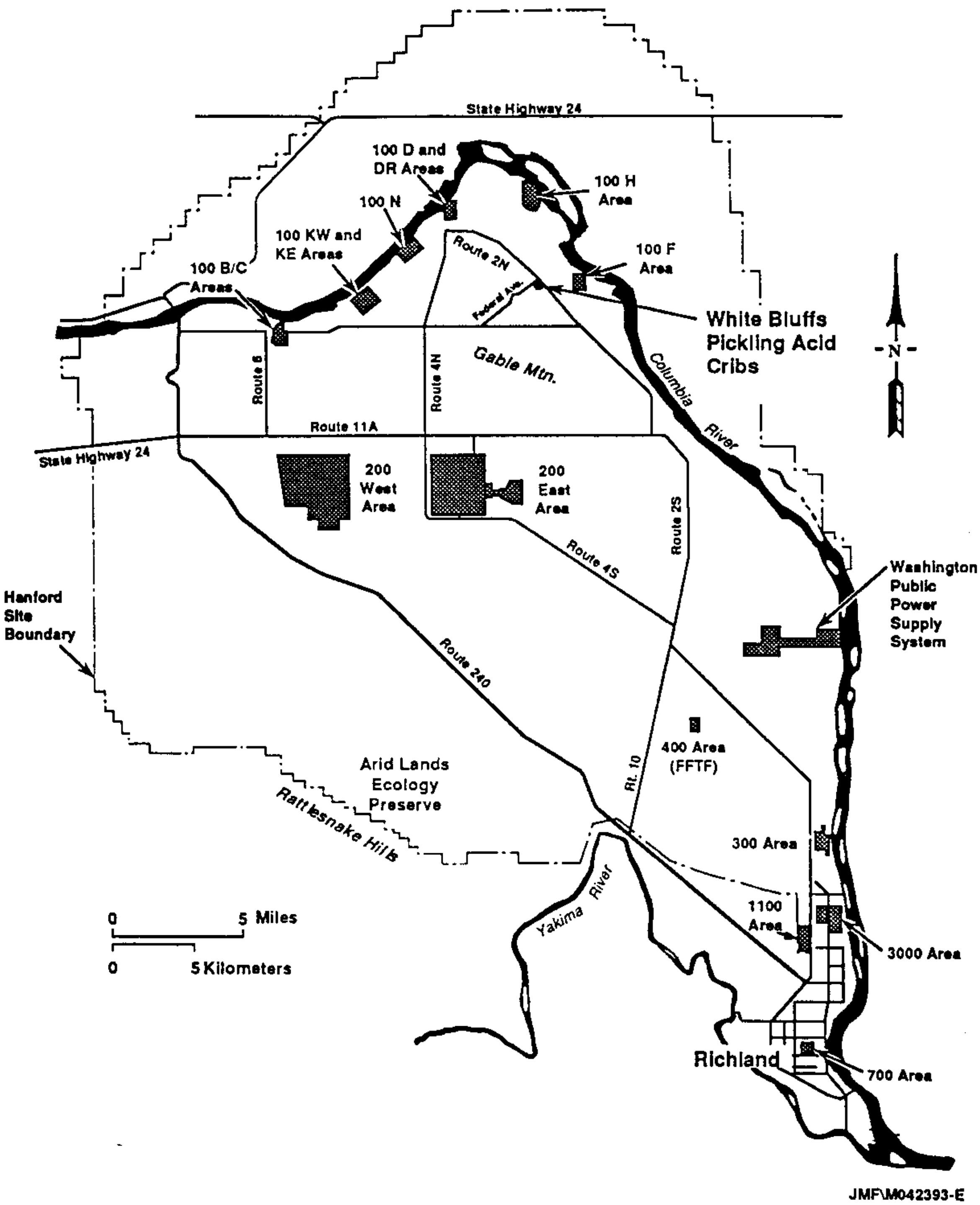
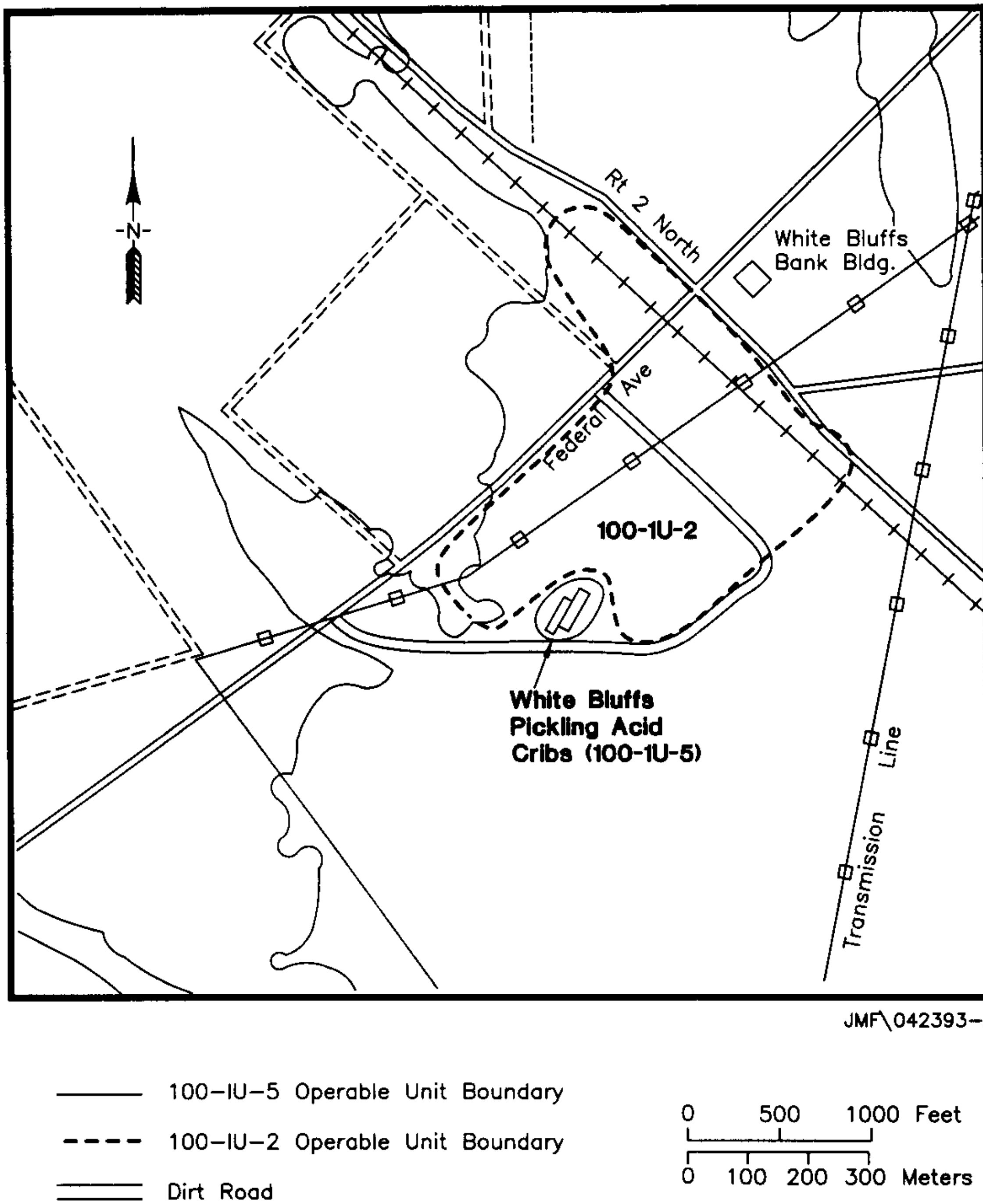


Figure 2. Location of the 100-IU-2 and 100-IU-5 Operable Units.



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There are two pickling acid cribs at the site, located side by side, each approximately 200 ft by 50 ft. Each crib contains three evenly spaced rows of vent pipes, spaced 7 to 9 ft apart, which protrude from the cobbled surface of and run the length of each crib. A riser pipe, approximately 36-in. diameter, protruded from the northern end of the west crib (this pipe was removed during the investigation to obtain samples of soil beneath it). The cribs are fed by underground pipelines suspected to come from the northeast. These influent pipelines will be located and investigated with this ERA.

To the north and east of the cribs are areas that appear to have been disturbed. The debris in the area indicates the possible presence of a landfill and/or building demolition areas. These areas are included in and will be investigated further as part of the 100-IU-2 operable unit. Investigation of the groundwater beneath 100-IU-5 will be conducted during the 100-IU-2 investigation to effectively determine potential contamination sources.

3.0 CHARACTERIZATION ACTIVITIES

The objective of ERA characterization activities was to determine the nature and extent of any environmental hazards at the site in question. Site characterization activities at the cribs were conducted late in 1992 and consisted of radiological surveys, nonintrusive ground-penetrating radar (GPR) and electromagnetic induction (EMI) surveys, historical research, visual site surveys, and soil sampling. The results of these activities are presented in the following sections.

3.1 RADIOLOGICAL SURVEYS

It is known that the White Bluffs area was restricted from receiving radioactive materials during facility operations. Both surface surveys and subsurface soil samples were taken to confirm this observation. Neither of the radiological surveys detected any radioactivity distinguishable from background levels. Soil sample data are presented in Appendix A.

3.2 GEOPHYSICAL SURVEYS

The GPR and EMI surveys conducted at the site in September 1992 (WHC 1992a) provided an initial look at the boundaries of the cribs and the subsurface piping layout (Figure 3). This information was used during the preparation of the sampling plan to identify sampling locations. A majority of the information identified in the preliminary investigation was confirmed during the subsurface soil sampling. Interestingly, the two influent pipes do not merge, as was suggested by the underground survey. This suggests different sources. The actual layout of the influent pipes has been sketched on Figure 3. Figure 4 shows a section through each crib.

Figure 3. GPR Report/Pipe Layout.

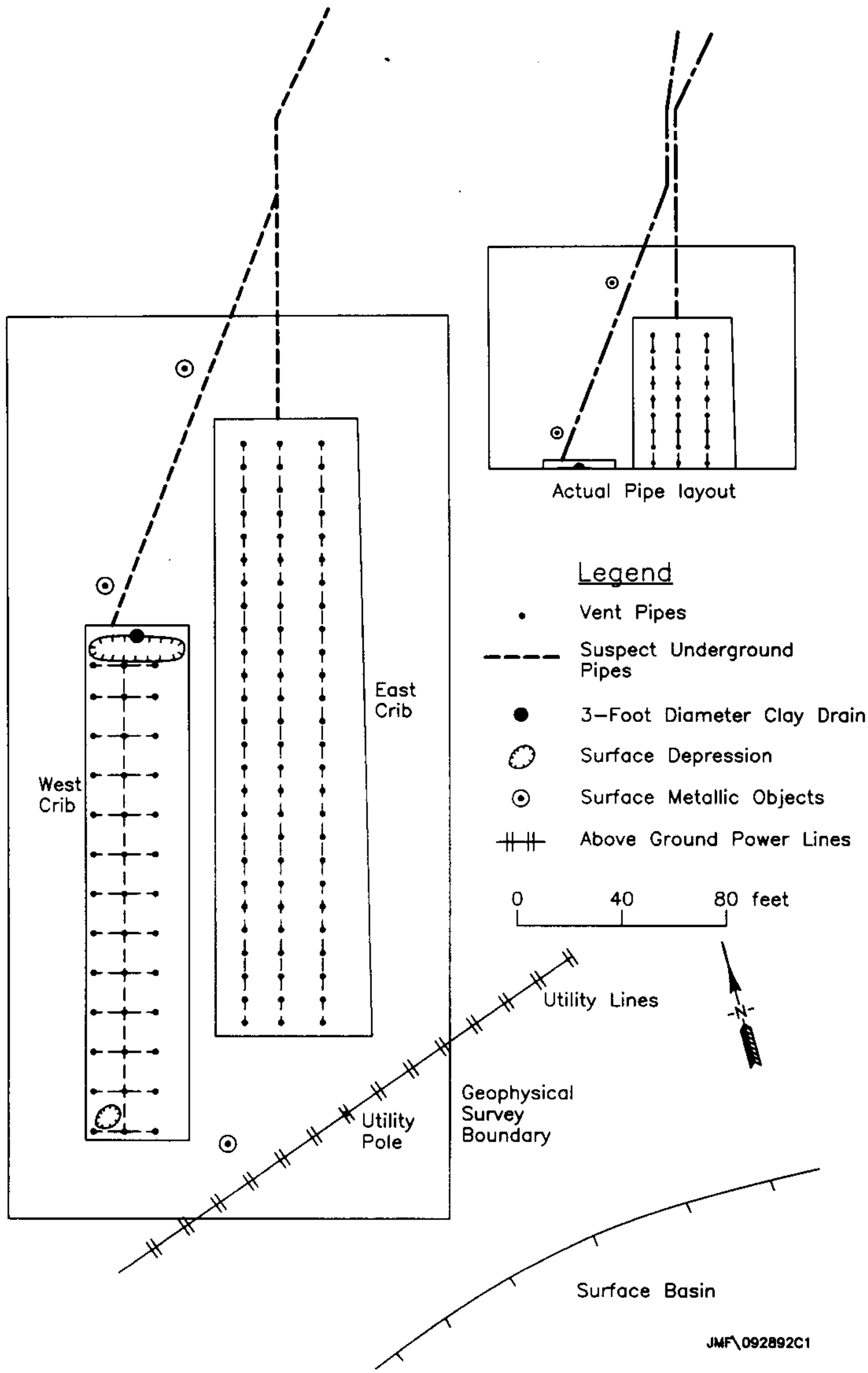
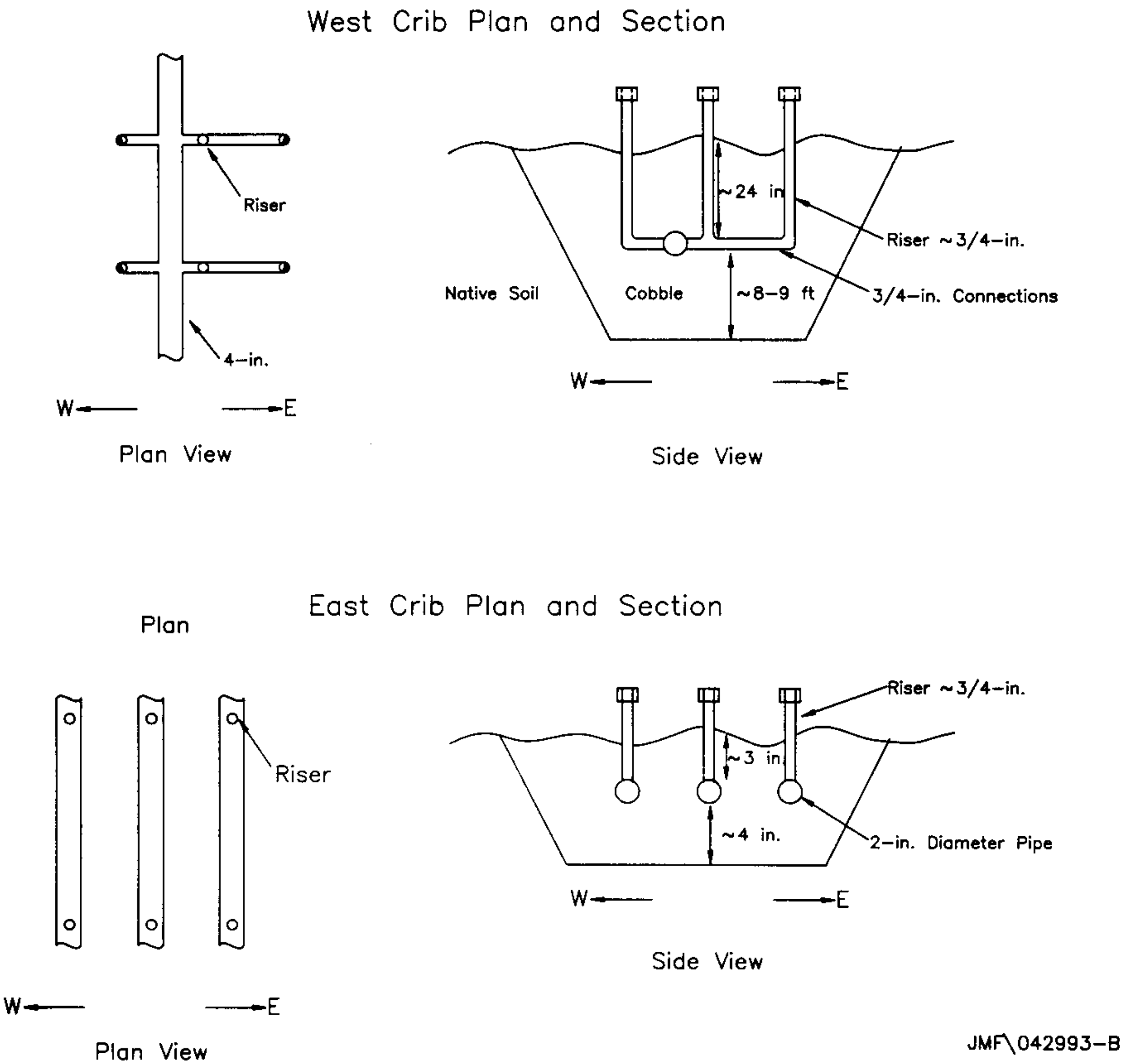


Figure 4. Plan and Sections Through Cribs.



3.3 HISTORICAL RESEARCH

Minimal historical data exist regarding the use of the White Bluffs Pickling Acid Cribs. Available information indicates only that the pickling process used "several thousand gallons of acid" (DOE-RL 1992); however, this volume is suspect since "several thousand gallons of acid" could refer to the acid etch solution, which is only 9-12% acid in an aqueous solution. While the information available was not specific regarding quantities, it was useful in narrowing the constituents of concern for this ERA to acids and the etching byproducts.

3.4 SAMPLING

Soil samples were collected from December 1 through December 7, 1992. These samples were both field screened and analyzed at a qualified analytical laboratory. A detailed sampling and analysis plan (WHC 1992b) was prepared for this activity. This document received regulatory approval prior to the initiation of sampling activities.

Both surface and intrusive soil samples were taken to determine the nature and extent of potential soil contamination. Surface sampling consisted of collecting soil samples to a depth of 1 ft or less. Intrusive soil samples were obtained from test pits at depths to 16 ft below the surface. Samples were taken directly beneath the soil cobble interface and 5 ft below that level. The test pits were also used to verify the configuration of the piping system and provided a visual inspection of the crib construction. The excavated material (soil, cobbles) was returned to the cribs after samples were taken. Table 1 details the soil samples location and analyses, while Figure 5 maps the sampling locations. Sample results are presented and validated in the *White Bluffs Pickling Acid Crib Expedited Response Action Data Validation Report* (WHC 1993).

The sampling effort included investigating the crib's feeder pipes, which travel north out of both cribs, and a depression on the southeastern corner of the eastern crib ("D" samples on Figure 5), which may have been an overflow.

4.0 DATA ASSESSMENT

4.1 CONTAMINANTS OF CONCERN

Records indicate that the cribs were used as a disposal area for waste acids used to etch pipes. The sampling concentrated on looking for acids (nitric and hydrofluoric) and metals (chrome, zirconium) that might still be bound up in the soil. Over 35 years have lapsed since disposal to the facility ceased. Historical records did not indicate the disposal of other chemicals at the site; however, since it is known that the White Bluffs area was used as a receiving area for construction activities, it is also possible that oils and solvents may have been used during routine maintenance

Table 1. Soil Sampling Locations and Analyses.

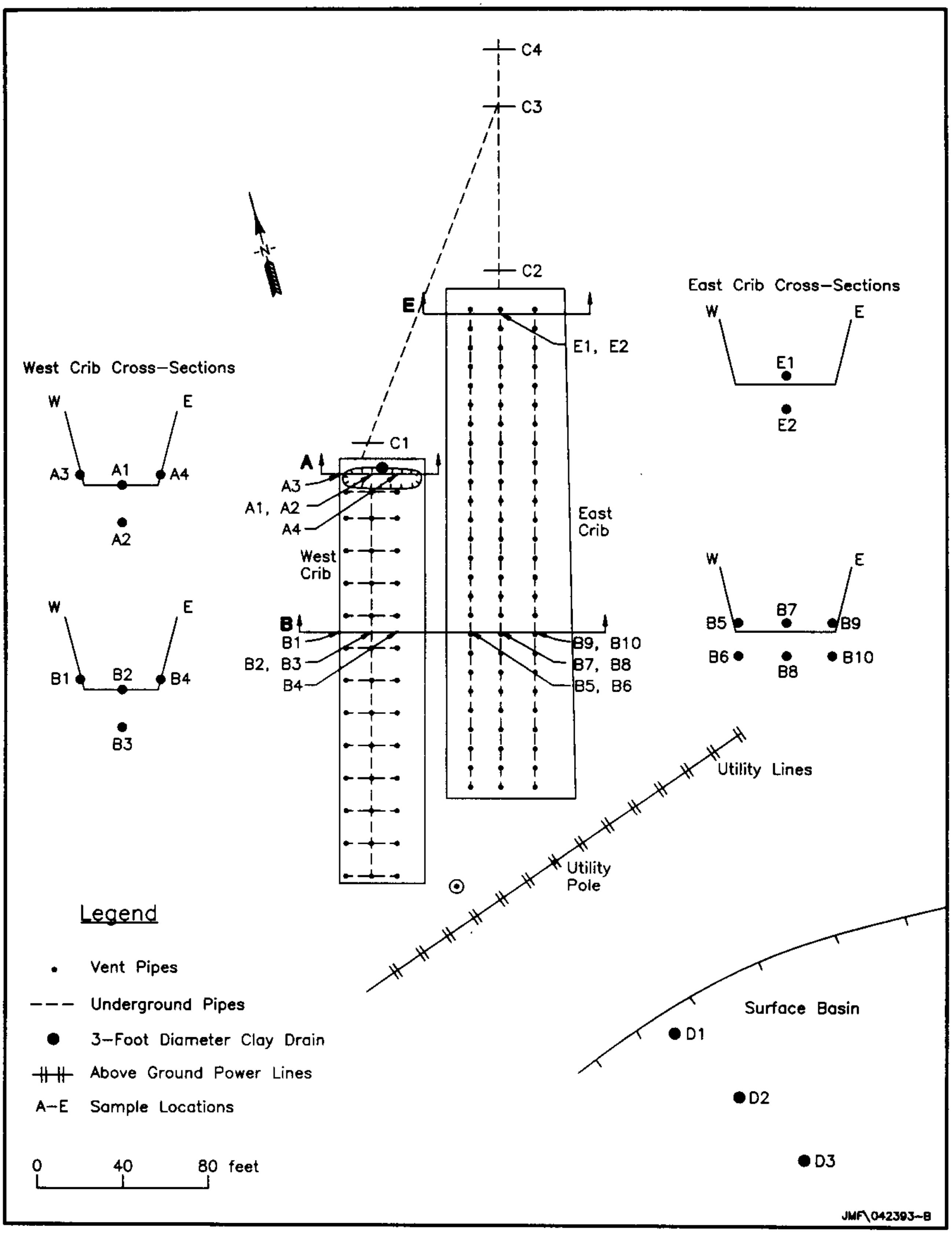
SAMPLE SITE	SAMPLE IDENTIFIER (HEIS #)	LOCATION OF SAMPLE	ANALYSES
A1	B07PY8	10 ft below surface, taken within 1 foot of interface between soil and crib bottom.	FS
A2	B07PZ1	14 ft below surface, directly beneath A1	FS
A3	B07PY9	9 ft below surface	SS
A4	B07PZ3	8 ft below surface	SS
B1	B07PZ5	6-7 ft below surface	SS
B2	B07PZ6	11-12 ft below surface	FS
B3	B07PZ7	15-16 ft below surface	FS
B4	B07P78	6-7 ft below surface	SS
B5	B07PZ9	5-6 ft below surface	SS
B6	B07Q00	10-11 ft below surface	SS
B7	B07Q01	5-6 ft below surface	FS
B8	B07Q03	10-11 ft below surface	FS
B9	B07Q04	5-6 ft below surface	SS
B10	B07Q05	10-11 ft below surface	SS
C1	B07Q06	3-4 ft below surface	SS
C2	B07Q09	4-5 ft below surface	SS
C3	B07Q07	3-4 ft below surface	SS
C4	B07Q08	3-4 ft below surface	SS
D1	B07Q10	6-12 in. below surface	SS
D2	B07Q11	6-12 inches below surface	SS
D3	B07Q12	6-12 inches below surface	FS
E1	B07PZ2	7 ft below surface	FS
E2	B07PZ4	12 ft below surface	FS
NA	B07Q02	Duplicate of sample B07Q01	FS
NA	B07Q13	Split of sample B07Q12	FS
NA	B07Q14, B07Q15, B07Q16	Background samples, taken in undisturbed soil west of the cribs (6-12 inches below surface)	SS
NA	B07PZ0	Equipment Blank	SS

FS = Indicates sample was analyzed for the full suite of analyses, which includes <u>TAL Metals</u>, <u>6010 FOR ZR</u>, <u>Anions (EPA 300.0)</u>, <u>Nitrate/nitrite (EPA 353.2)</u>, <u>Ammonia</u>, <u>pH</u>, <u>Calcium Carbonate (Hardness, EPA 130.2)</u>, <u>Semi-VOA (CLP)</u>, VOA (CLP), Gamma Spec, TPH (Diesel Range), TPH (Heavier than Diesel Range)

SS = The short list samples were analyzed for expected contaminants. These are all categories in the FS list that have been underlined.

NA = Not Applicable, sample site not numbered.

Figure 5. Soil Sampling Locations.



activities and sent through a drain to the cribs. Some samples were analyzed for other chemicals (organics, radionuclides) that could indicate other waste products that might have been discarded.

4.2 DATA VALIDATION

All samples sent to offsite laboratories were analyzed per EPA Level IV quality (radiological samples, Level V), and the analysis results have been sent to an offsite contractor for data validation (WHC 1993). Validation reports have qualified the data as indicated in Tables 2 and 3 presented in Section 4.3.

4.3 DATA TABLES

Tables 2 and 3 present the condensed results of soil sampling analysis. The tables have been separated into anions and metals, which were the primary contaminants of concern. Both sets of data have been condensed to include only metals and anions, which would be indicators of acid etch solution disposal. A complete set of all sample analysis results is provided in Appendix A. The definition of qualifiers is presented below.

U — Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ — Indicates the compound or analyte was analyzed for and not detected. Because of quality control (QC) deficiencies identified during data validation, the value reported may not accurately reflect the sample quantitation limit.

J — Indicates the compound or analyte was analyzed for and detected. The associated value is estimated, but the data are usable for decision-making processes.

R — Indicates the compound or analyte was analyzed for and because of an identified QC deficiency the data are not usable.

JN — Indicates presumptive evidence of a compound at an estimated value.

VJN — Indicates the compound or analyte was originally identified from presumptive evidence. Because of QC deficiencies identified during data validation, the value reported may not accurately reflect the sample quantitation limit.

Table 2. Metals (Reported in mg/kg). (Sheet 1 of 2)

Sample	AL	CR	CU	FE	PB	MG	MN	NI	ZN	ZR
B07PY8	5360	9.1	23.5	14600	3.9	3310	138 J	62 B	71.8	17.1 U
B07PY9	5650	9.4	16.7 U	14200	3.4	3610	142 J	8.3	63.7	17.5 U
B07PZ1	5700	11.2	20.7	13500	4.1	4080	175 J	9.5	50.7	18.0
B07PZ3	5020	8.0	13.6 U	15300	3.1	3460	149 J	7.1 B	60.5	18.3 U
Section A Avg.	5433	9.4	18.6	14400	3.6	3615	151	7.8	61.7	17.7
B07PZ2	5010	9.3	17.3 U	12700	3.1	3720	156 J	8.8	30.3	17.4 U
B07PZ4	5550	10.0	17.6 U	13200	4.0	4350	213 J	10.3	31.3	18.6 U
Section E Avg.	5280	9.7	17.5	12950	3.6	4035	185	9.6	30.8	18.0
B07PZ5	6810	14.0	17.6 U	15900	4.2	5130	226 J	14.3	43.0	18.2 U
B07PZ6	4310	7.7	15.2 U	12900	3.5	2960	144 J	7.9 B	30.5	17.9 U
B07PZ7	4630	8.7	13.7 U	12300	2.6	3570	177 J	8.0 B	28.8	18.1 U
B07PZ8	4640	9.1	11.0 U	11600	2.5	3520	149 J	8.7	28.0	17.3
B07PZ9	7000	13.6	16.9 U	15600	6.5	6500	265 J	13.3	40.9	18.6 U
B07Q00	4140	7.5	13.7 U	14900	2.5	3420	183 J	8.8	30.6	17.4 U
B07Q01	5800	10.2	14.6 U	15000	3.3	4620	190 J	10.8	35.6	17.5 U
B07Q03	4320	9.3	11.8 U	12600	2.9	3560	178 J	8.8	28.0	16.9 U
B07Q04	5930	11.0	10.5	16000	3.4	4920	212	10.7	38.2	18.7 U
B07Q05	4170	7.2	13.2	15900	2.5	3470	218	9.6	33.6	20.8 U
Section B Avg.	5175	9.8	13.8	14270	3.4	4167	194	10.1	33.7	18.1
B07Q06	5730	10.0	9.7	17600	2.9	4390	240	9.8	35.0	17.3 U
B07Q09	5720	7.9	10.7	20800	3.4	4320	376	11.3	46.6	17.7 U
B07Q07	6010	9.9	10.4	19100	3.6	4410	257	10.6	1020.0	25.9
B07Q08	4070	6.5	6.6 U	12900	4.3	3220	196	7.4 B	1070.0	17.9 U
Section C Avg.	5383	8.6	9.4	17600	3.6	4085	267	9.8	542.9	19.7

Table 2. Metals (Reported in mg/kg). (Sheet 2 of 2)

SAMPLE	AL	CR	CU	FE	PB	MG	MN	NI	ZN	ZR
B07Q10	5730	10.2	18.7	16300	6.7	3740	190	9.2	68.7	19.2 U
B07Q11	8060	13.3	14.2	23400	5.1	5210	263	12.5	554.0	19.4 U
B07Q12	7370	43.1	11.4	19200	3.9	4040	177	27.8	50.5	17.2 U
Section D Avg.	7053	22.2	14.8	19633	5.2	4330	210	16.5	224.4	18.6
BACKGROUND										
B07Q14	6090	8.5	9.3 U	20500	3.5	3850	347	8.7	46.6	20.9
B07Q15	6090	8.8	9.1 U	17900	3.1	3680	317	8.9	43.3	20.4 U
307Q16	7220	9.8	10.1	23300	3.5	4180	372	9.9	49.4	30.7

Table 3. Anions (Reported in mg/kg).

SAMPLE	NO3/NO2 (AS N)	CHLORIDE	FLUORIDE	PHOSPHATE	SULFATE	pH
B07PY8 A1	7.41	1.80 J	0.30 J	0.80 UJ	25.00 J	5.50
B07PY9 A3	3.83	2.30 J	0.40 J	0.80 UJ	15.00 J	6.70
B07PZ1 A2	3.89	1.40 J	0.60 J	1.00 J	13.00 J	7.90
B07PZ3 A4	2.52	1.80 J	1.40 J	1.00 J	10.00	7.20
A Average	4.41	1.83	0.43	0.90	15.75	6.83
B07PZ2 E1	2.42 U	2.10 J	1.10 J	1.00 J	11.00 J	8.30
B07PZ4 E2	2.42 U	2.10 J	0.80 J	1.00 J	11.00 J	8.90
E Average	2.42	2.10	0.95	1.00	11.00	8.60
B07PZ5 B1	2.43 U	2.20 J	0.50 J	2.00 J	6.00 J	9.00
B07PZ6 B2	2.53 U	2.00 J	0.40 J	0.80 UJ	8.00 J	7.80
B07PZ7 B3	2.48 U	1.80 J	0.30 J	1.00 J	6.00 J	8.60
B07PZ8 B4	2.59 U	2.20 J	0.30 J	1.00 J	5.00 J	8.30
B07PZ9 B5	2.46 U	2.20 J	0.70 J	0.80 UJ	10.00 J	8.70
B07Q00 B6	2.46 U	1.80 J	0.30 J	1.00 J	6.00 J	9.10
B07Q01 B7	2.54 U	2.00 J	1.00 J	1.00 J	10.00 J	9.20
B07Q03 B8	2.57 U	2.10 J	0.30 J	1.00 J	6.00 J	9.60
B07Q04 B9	2.55 UJ	2.30 J	1.00 J	1.00 J	6.00 J	9.10
B07Q05 B10	2.52 UJ	2.10 J	0.50 J	0.80 UJ	5.00 J	8.50
B Average	2.51	2.07	0.53	1.04	6.80	8.79
B07Q06 C1	2.47 UJ	12.00 J	1.50 J	0.80 UJ	292.00 J	9.00
B07Q09 C2	2.51 UJ	181.00 J	2.50	0.80 J	329.00 J	8.50
B07Q07 C3	2.42 UJ	7.80 J	1.90 J	2.00 UJ	44.00 J	10.40
B07Q08 C4	2.50 UJ	2.30 J	1.40 J	1.00 J	4.00 J	8.50
C Average	2.48	50.78	1.83	1.15	167.25	9.10
B07Q10 D1	16.30 J	5.10 J	0.70 J	2.00 J	95.00 J	6.80
B07Q11 D2	3.70 J	3.40 J	1.00 J	2.00 J	42.00 J	6.40
B07Q12 D3	3.52 J	11.50 J	1.40 J	1.00 J	23.00 J	7.10
D Average	7.8	6.7	1.0	1.7	53.3	6.8
BACKGROUND						
B0Q14	3.24 J	2.3 J	0.6 J	2 J	4 J	
B0Q15	5.81 J	3 J	0.3 J	2 J	54 J	
B0Q16	2.51 UJ	3 J	0.7 J	2 J	4 J	

4.4 DATA SUMMARY

A review of the analytical data indicated none of the contaminants present a risk to human helath or the environment. Most chemical concentrations are well within the range of background concentrations obtained from samples taken in undisturbed soil by the White Bluffs Cribs site. Data were also compared with the Hanford Site-wide background 95/95 reference threshold values (DOE-RL 1993a).

The chemicals with average concentrations above background are chromium, copper, and zinc (Table 4). For these constituents, risk-based goals were calculated using the most conservative assumptions (residential scenario) from the *Hanford Site Baseline Risk Assessment Methodology* (DOE-RL 1993b). The goals are protective of human health at a 1 x 10^{-6} incremental cancer risk for carcinogens or a hazards of 1.0 for systemic toxicity. The maximum detected concenetrations of chromium and zinc were well below these risk-based goals. Sufficient toxicological information is not available to calculate a value for copper.

Table 4. Risk Evaluation for Chemicals with Concentrations Above Background.

Chemical of concern (Ave. detected > background)	Background range (mg/kg) [DOE/RL-92-24[a]]	Detected range (Average-mg/kg)	Lowest risk-based goal for soil (mg/kg)
Chromium	8.5-9.8 [28]	6.5-43.1 (10.52)	8000
Copper	9.3-10.1 [30]	6.6-23.5 (13.37)	Data not available[b]
Zinc	43.3-46.6 [79]	28-1070[c] (137.7)	2400

[a]DOE-RL (1993a).
[b]Copper toxicity values are not in the EPA's integrated Risk Information System, which was used to develop risk-based standards.
[c]The highest values of zinc were found directly beside the galvanized pipe. The value was most likely elevated due to the presence of metal pipe scrapings in the sample, since the pipe was hit while excavating to expose it, or from pipe corrosion. The lower set of values corresponds to range and average if the highest value is thrown out.

5.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 7.5 of the Action Plan in the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989) contains the basic description of applicable or relevant and appropriate requirements (ARAR).

There are no applicable federal cleanup standards or chemical-specific ARARs for compounds in soil (hazardous or radioactive) except the EPA standards for lead and radium. Washington State Regulations (WAC 173-340) provide soil cleanup standards; however, because the sampling data do not indicate any contamination of the background levels, the cribs are not a threat to human health and/or the environment.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The chemical concentrations detected at the White Bluffs Pickling Acid Cribs Site do not indicate that the cribs pose any threat to human health or the environment, since the chemicals detected are well within background soil concentration ranges. Therefore, the site no longer exists as a potential source of contamination to the groundwater. Historical releases to the cribs may have released some chemical inventory to the groundwater; however, because the unit is bordered on three sides by 100-IU-2, groundwater sampling in the vicinity of the pickling acid cribs will not clearly determine if the cribs were a source of contamination until the waste units surrounding them are investigated. Groundwater will be investigated with the 100-IU-2 operable unit.

No action to remove contamination is required for the completion of the White Bluffs Pickling Acid Cribs ERA. It is recommended that a No Further Action Interim Record of Decision be issued to the DOE for the vadose zone in the 100-IU-5 operable unit. It is further recommended that the physical hazards associated with the cribs be removed from the site as a landlord cleanup action.

7.0 REFERENCES

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APPENDIX A

ANALYTICAL DATA

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The following are definitions of data qualifiers used in the tables in this appendix.

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Table A-1. Metals Analysis and Qualifier Summary. (sheet 1 of 3)

Sample Number:	B07PY8	B07PY9	B07PZ0	B07PZ1	B07PZ2	B07PZ3	B07PZ4	B07PZ5	B07PZ6
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	5360	5650	33.9	5700	5010	5020	5550	6810	4310
Antimony	2.9 UJ	2.9 UJ	2.9 UJ	3 UJ	2.9 UJ	3.1 UJ	3.1 UJ	3.1 UJ	3 UJ
Arsenic	1.5 J	1.6 J	0.36 UJ	1.2 J	1.1 J	1 J	2.3 J	1.9 J	1.2 J
Barium	44.1	41.2	0.14 U	36.8	44.7	39.4	50.8	56.1	41
Beryllium	0.17	0.21	0.06 U	0.19	0.22	0.18	0.19	0.28	0.16
Cadmium	0.29 U	0.3 U	0.29 U	0.31 U	0.3 U	0.31 U	0.32 U	0.31 U	0.31 U
Calcium	2600	2810	4 UJ	2870	2800	3010	8010	4650	2850
Chromium	9.1	9.4	0.51 UJ	11.2	9.3	8	10	14	7.7
Cobalt	6.4	6	0.25 UJ	6.6	6.1	6.8	6.2	9.1	7.3
Copper	23.5	16.7 U	8.4 U	20.7	17.8 U	13.6 U	17.6 U	17.6 U	15.2 U
Iron	14600	14200	451	13500	12700	15300	13200	15900	12900
Lead	3.9	3.4	0.77	4.1	3.1	3.1	4	4.2	3.5
Magnesium	3310	3610	7.3	4080	3720	3460	4350	5130	2960
Manganese	138 J	142 J	0.23 J	175 J	156 J	149 J	213 J	226 J	144 J
Mercury	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nickel	6.2	8.3	0.51 UJ	9.5	8.8	7.1	10.3	14.3	7.9
Potassium	820	862	15.5 U	763	824	784	794	1030	542
Selenium	0.59 UJ	0.54 UJ	0.75 J	0.62 J	0.6 UJ	1.1 J	0.61 UJ	0.59 UJ	0.57 UJ
Silver	0.7 U	0.89	0.7 U	0.74 U	0.96	0.98	0.76 U	1.2	0.86
Sodium	139 U	166	22.1 UJ	171	136 U	151 U	166	189	158
Thallium	0.27 U	0.24 U	0.25 U	0.27 U	0.27 U	0.26 U	0.27 U	0.26 U	0.25 U
Vanadium	41.4	37	0.49 U	34.1	30.1	41.6	32.4	36.7	39.2
Zinc	71.8	63.7	1.8 U	50.7	30.3	60.5	31.3	43	30.5
Zirconium	17.1 U	17.5 U	17.2 U	18 U	17.4 U	18.3 U	18.6 U	18.2 U	17.9 U

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Table A-1. Metals Analysis and Qualifier Summary. (sheet 2 of 3)

Sample Number:	B07PZ7	B07PZ8	B07PZ9	B07QO0	B07QO1	B07QO2	B07QO3	B07QO4	B07QO5	B07QO6
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	4630	4640	7000	4140	5800	5730	4320	5930	4170	5730
Antimony	3 UJ	2.9 UJ	3.1 UJ	2.9 UJ	2.9 UJ	3.1 UJ	2.8 UJ	3.9 UJ	4.4 UJ	3.6 UJ
Arsenic	1.2 J	1.2 J	2 J	1.3 J	1.3 J	1.5 J	1 J	2	1.3	1.7
Barium	29.5	29.7	73.8	43.1	58.3	54	38.1	67	39.7	55.6
Beryllium	0.13	0.14	0.24	0.2	0.31	0.24	0.18	0.23	0.18	0.26
Cadmium	0.31 U	0.29 U	0.32 U	0.3 U	0.3 U	0.31 U	0.29 U	0.34 U	0.38 U	0.32 U
Calcium	2800	2590	22400	3530	6410	6330	5170	9130	4310	6750
Chromium	8.7	9.1	13.6	7.5	10.2	9.6	9.3	11	7.2	10
Cobalt	5.9	5.7	8.7	7.5	7.3	8.3	6.5	7.1	7.2	6.9
Copper	13.7 U	11 U	16.9 U	13.7 U	14.6 U	14.7 U	11.8 U	10.5	13.2	9.7
Iron	12300	11600	15600	14900	15000	15300	12600	16000	15900	17600
Lead	2.6	2.5	6.5	2.5	3.3	5.3	2.9	3.4	2.5	2.9
Magnesium	3570	3520	6500	3420	4620	4910	3560	4920	3470	4390
Manganese	177 J	149 J	265 J	183 J	190 J	200 J	178 J	212	218	240
Mercury	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nickel	8	8.7	13.3	8.8	10.8	11.8	8.8	10.7	9.6	9.8
Potassium	555	630	1140	504	1010	1010	551	1230 J	546 J	1260 J
Selenium	0.54 UJ	0.64 J	0.95 J	0.67 J	0.63 UJ	0.6 UJ	0.68 J	0.63 U	0.72 UJ	0.58 UJ
Silver	0.74 U	0.95	0.76 U	0.81	0.75	0.79	0.69 U	0.99	0.97	1.3
Sodium	149 U	124 U	194	173	142 U	145 U	129 U	154	200	362
Thallium	0.24 U	0.24 U	0.3 U	0.26 U	0.28 U	0.27 U	0.26 U	0.53 U	0.6 U	0.48 U
Vanadium	33.6	27.1	33.9	40.5	34.9	35.4	34.2	34.1	39.7	35.9
Zinc	28.8	28	40.9	30.6	35.6	38	28	38.2	33.6	35
Zirconium	18.1 U	17.3 U	18.6 U	17.4	17.5 U	18.4 U	16.9 U	18.7 U	20.8 U	17.3 U

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Table A-1. Metals Analysis and Qualifier Summary. (sheet 3 of 3)

Sample Number:	B07QO7	B07QO8	B07QO9	B07Q10	B07Q11	B07Q12	B07Q13	B07Q14	B07Q15	B07Q16
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	6010	4070	5720	5730	8060	7370	5370	6090	6090	7220
Antimony	4.4 UJ	3.7 UJ	3.7 UJ	4 UJ	4.1 J	3.6 UJ	12.2 U	3.5 UJ	4.3 UJ	4.8 J
Arsenic	1.7	1.6	1.2	0.87	1	3.6	2.4	0.87	0.9 U	1.2
Barium	58.1	46.8	75.1	50.8	64.3	57.9	52.3	72.8	68.2	79.6
Beryllium	0.29	0.19	0.31	0.19	0.36	0.3	0.29	0.31	0.26	0.37
Cadmium	0.39 U	0.9	0.32 U	0.35 U	0.35 U	0.31 U	1.43 U	0.31 U	0.37 U	0.35 U
Calcium	5220	4230	3900	3400	4940	3460	3250	3420	3390	3760
Chromium	9.9	6.5	7.9	10.2	13.3	43.1	9.5	8.5	8.8	9.8
Cobalt	7.6	5.9	10.9	6.7	10	9.3	8.4	9.7	8.4	11
Copper	10.4	6.6 U	10.7	18.7	14.2	11.4	13.2	9.3 U	9.1 U	10.1
Iron	19100	12900	20800	16300	23400	19200	14600	20500	17900	23300
Lead	3.6	4.3	3.4	6.7	5.1	3.9	3.6	3.5	3.1	3.5
Magnesium	4410	3220	4320	3740	5210	4040	3670	3850	3680	4180
Manganese	257	196	376	190	263	177	143	347	317	372
Mercury	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U
Nickel	10.6	7.4	11.3	9.2	12.5	27.8	13.6 U	8.7	8.9	9.9
Potassium	1140 J	866 J	1020 J	1430 J	1980 J	1710 J	1410 U	1490 J	1710 J	1620 J
Selenium	0.74 UJ	0.61 U	0.65 J	0.68 U	0.7 UJ	0.67 U	0.41 UJ	0.6 U	0.71 U	0.67 UJ
Silver	1.8	0.81	1.3	1	1.5	0.93	2.04 U	1.4	1.3	2.1
Sodium	543	750	178	136	493	165	165 J	131	140	176
Thallium	0.62 U	0.51 U	0.52 U	0.57 U	0.59 U	0.56 U	0.41 U	0.51 U	0.6 U	0.56 U
Vanadium	40.9	30.1	52.6	39.8	55.9	51.5	36	48.5	42.7	58.8
Zinc	1020	1070	46.6	68.7	554	50.5	40.4	46.6	43.3	49.4
Zirconium	25.9	17.9 U	17.7 U	19.2 U	19.4 U	17.2 U	40.8 U	20.9	20.4 U	30.7

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Table A-2. Anions and Nitrate/Nitrite Analysis and Qualifier Summary. (sheet 1 of 3)

Sample Number:	B07PY8	B07PY9	B07PZ0	B07PZ1	B07PZ2	B07PZ3	B07PZ4	B07PZ5	B07PZ6	B07PZ7
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chloride	1.8 J	2.3 J	3 J	1.4 J	2.1 J	1.8 J	2.1 J	2.2 J	2 J	1.8 J
Fluoride	0.3 J	0.4 J	0.2 J	0.6 J	1.1 J	0.4 J	0.8 J	0.5 J	0.4 J	0.3 J
Phosphate	0.8 UJ	0.8 UJ	0.8 UJ	1 J	1 J	1 J	1 J	2 J	0.8 UJ	1 J
Sulfate	25 J	15 J	3 J	13 J	11 J	10 J	11 J	6 J	8 J	6 J
Nitrate/Nitrite	7.41	3.83	2.43 U	3.89	2.42 U	2.52	2.44 U	2.43 U	2.53 U	2.48 U

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Table A-2. Anions and Nitrate/Nitrite Analysis and Qualifier Summary. (sheet 2 of 3)

Sample Number:	B07PZ8		B07PZ9		B07QO0		B07QO1		B07QO2		B07QO3		B07QO4		B07QO5		B07QO6		B07QO7	
Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Chloride	2.2	J	2.2	J	1.8	J	2	J	2.2	J	2.1	J	2.3	J	2.1	J	12	J	181	J
Fluoride	0.3	J	0.7	J	0.3	J	1	J	1.1	J	0.3	J	1	J	0.5	J	1.5	J	2.5	J
Phosphate	1	J	0.8	UJ	1	J	1	J	1	J	1	J	1	J	0.8	UJ	0.8	UJ	0.8	UJ
Sulfate	5	J	10	J	6	J	10	J	10	J	6	J	6	J	5	J	292	J	329	J
Nitrate/Nitrite	2.59	U	2.46	U	2.46	U	2.54	U	2.46	U	2.57	U	2.55	UJ	2.52	UJ	2.47	UJ	2.51	UJ

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Table A-2. Anions and Nitrate/Nitrite Analysis and Qualifier Summary. (sheet 3 of 3)

Sample Number:	B07QO8		B07QO9		B07Q10		B07Q11		B07Q12		B07Q13		B07Q14		B07Q15		B07Q16	
Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Chloride	7.8	J	2.3	J	5.1	J	3.4	J	11.5	J	27		2.3	J	3	J	3	J
Fluoride	1.9	J	1.4	J	0.7	J	1	J	1.4	J	3.2		0.6	J	0.3	J	0.7	J
Phosphate	2	J	1	J	2	J	2	J	1	J	4.4		2	J	2	J	2	J
Sulfate	44	J	4	J	95	J	42	J	23	J	23.2		4	J	54	J	4	J
Nitrate/Nitrite	2.42	UJ	2.5	UJ	16.3	J	3.7	J	3.52	J	2.7	J	3.24	J	5.81	J	2.51	UJ

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Table A-3. Radiochemical Analysis and Qualifier Summary.

Customer I.D. No.	Cobalt 60		Cesium 137		Radium 226		Thorium 228	
	Reported Results in pCi/L	Qualifier	Reported Results in pCi/L	Qualifier	Reported Results in pCi/L	Qualifier	Reported Results in pCi/L	Qualifier
TMA N2-12-018-7133								
B07PY8	< 0.05	U	< 0.04	U	0.47		0.71	
B07PZ1	< 0.10	U	< 0.10	U	0.45		0.69	
*B07PZ2	< 0.03	U	< 0.03	U	0.49		0.73	
B07PZ4	< 0.04	U	< 0.03	U	0.51		0.99	
B07PZ6	< 0.05	U	< 0.04	U	0.48		0.83	
B07PZ7	< 0.05	U	< 0.04	U	0.42		0.63	
B07Q01	< 0.04	U	< 0.04	U	0.57		0.93	
*B07Q02	< 0.06	U	< 0.05	U	0.56		0.81	
B07Q03	< 0.05	U	< 0.04	U	0.50		0.70	
B07Q12	< 0.05	U	< 0.05	U	0.56		1.00	
Weston 9212L005								
*B07Q13	< 0.00591	UJ	0.0156	J	0.497	J	N/A	

* - Fully validated sample

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Table A-4. Volatile Organic Compounds Analysis and Qualifier Summary. (sheet 1 of 2)

Sample Number:	B07PY8	B07PZ1	B07PZ2	B07PZ4	B07PZ6	B07PZ7	B07Q01	B07Q02	B07Q03
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Chloromethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Bromomethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Vinyl Chloride	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Chloroethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Methylene Chloride	11 U	11 U	10 U	11 U	10 U	10 U	2 J	3 J	2 J
Acetone	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Carbon Disulfide	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,1-Dichloroethene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,1-Dichloroethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,2-Dichloroethene (total)	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Chloroform	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,2-Dichloroethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
2-Butanone	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,1,1-Trichloroethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Carbon Tetrachloride	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Bromodichloromethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,2-Dichloropropane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
cis-1,3-Dichloropropene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Trichloroethene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Dibromochloromethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,1,2-Trichloroethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Benzene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
trans-1,3-Dichloropropene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Bromoform	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
4-Methyl-2-Pentanone	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
2-Hexanone	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Tetrachloroethene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
1,1,2,2-Tetrachloroethane	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Toluene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Chlorobenzene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Ethylbenzene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Styrene	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U
Xylene (total)	11 U	11 U	10 U	11 U	10 U	10 U	11 U	11 U	10 U

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Table A-4. Volatile Organic Compounds Analysis and Qualifier Summary. (sheet 2 of 2)

Sample Number:	B07Q12		B07Q13	
Units:	µg/kg		µg/kg	
Chloromethane	10	U	10	U
Bromomethane	10	U	10	U
Vinyl Chloride	10	U	10	U
Chloroethane	10	U	10	U
Methylene Chloride	10	U	6	J
Acetone	10	U	10	U
Carbon Disulfide	10	U	10	U
1,1-Dichloroethene	10	U	10	U
1,1-Dichloroethane	10	U	10	U
1,2-Dichloroethene (total)	10	U	10	U
Chloroform	10	U	10	U
1,2-Dichloroethane	10	U	10	U
2-Butanone	10	U	10	U
1,1,1-Trichloroethane	10	U	10	U
Carbon Tetrachloride	10	U	10	U
Bromodichloromethane	10	U	10	U
1,2-Dichloropropane	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	UJ
Trichloroethene	10	U	10	U
Dibromochloromethane	10	U	10	UJ
1,1,2-Trichloroethane	10	U	10	UJ
Benzene	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	UJ
Bromoform	10	U	10	UJ
4-Methyl-2-Pentanone	10	U	10	UJ
2-Hexanone	10	U	10	UJ
Tetrachloroethene	10	U	10	UJ
1,1,2,2-Tetrachloroethane	10	U	10	UJ
Toluene	3	J	10	UJ
Chlorobenzene	10	U	10	UJ
Ethylbenzene	10	U	10	UJ
Styrene	10	U	10	UJ
Xylene (total)	10	U	10	UJ

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Table A-5. Semivolatile Organic Compounds Analysis and Qualifier Summary. (sheet 1 of 6)

Sample Number:	B07PY8	B07PY9	B07PZ0	B07PZ1	B07PZ2	B07PZ3	B07PZ4	B07PZ5	B07PZ6	B07PZ7
Units:	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
Phenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
bis(2-Choroethyl)Ether	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2-Chlorophenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
1,3-Dichorobenzene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
1,4-Dichlorobenzene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
1,2-Dichlorobenzene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2-Methylphenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,2'-oxybis(1-Chloropropane)	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
4-Methylphenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
N-Nitroso-Di-n-Propylamine	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Hexachloroethane	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Nitrobenzene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Isophorone	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2-Nitrophenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,4-Dimethylphenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
bis(2-Chloroethoxy)Methane	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,4-Dichlorophenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
1,2,4-Trichlorobenzene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Naphthalene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
4-Chloroaniline	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Hexachlorobutadiene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
4-Chloro-3-Methylphenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2-Methylnaphthalene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Hexachlorocyclopentadiene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,4,6-Trichlorophenol	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,4,5-Trichlorophenol	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
2-Chloronaphthalene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2-Nitroaniline	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
Dimethylphthalate	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Acenaphthylene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
3-Nitroaniline	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
Acenapthene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,4-Dinitrophenol	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U

Table A-5. Semivolatile Organic Compounds Analysis and Qualifier Summary. (sheet 2 of 6)

Sample Number:	B07PY8	B07PY9	B07PZ0	B07PZ1	B07PZ2	B07PZ3	B07PZ4	B07PZ5	B07PZ6	B07PZ7
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4-Nitrophenol	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
Dibenzofuran	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,4-Dinitrotoluene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
2,6-Dinitrotoluene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Diethylphthalate	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
4-Chlorophenyl-phenylether	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Fluorene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
4-Nitroaniline	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
4,6-Dinitro-2-methylphenol	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
N-Nitrosodipheylamine (1)	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
4-Bromophenyl-phenylether	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Hexachlorobenzene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Pentachlorophenol	870 U	800 U	780 U	840 U	810 U	840 U	850 U	840 U	820 U	820 U
Phenanthrene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Anthracene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Carbazole	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Di-n-Butylphthalate	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Fluoranthene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Pyrene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Butylbenzylphthalate	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
3,3'-Dichlorobenzidine	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Benzo(a)Anthracene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
bis(2-Ethylhexyl)Phthalate	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Chrysene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Di-n-Octyl Phthalate	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Benzo(b)Fluoranthene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Benzo(k)Fluoranthene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Benzo(a)Pyrene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Indeno(1,2,3-cd)Pyrene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Dibenz(a,h)Anthracene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U
Benzo(g,h,i)Perylene	360 U	330 U	320 U	350 U	330 U	340 U	350 U	340 U	340 U	340 U

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Table A-5. Semivolatile Organic Compounds Analysis and Qualifier Summary. (sheet 3 of 6)

Sample Number:	B07PZ8	B07PZ9	B07QO0	B07QO1	B07QO2	B07QO3	B07QO4	B07QO5	B07QO6	B07QO7
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Phenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
bis(2-Choroethyl)Ether	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2-Chlorophenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
1,3-Dichorobenzene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
1,4-Dichlorobenzene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
1,2-Dichlorobenzene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2-Methylphenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
4-Methylphenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
N-Nitroso-Di-n-Propylamine	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Hexachloroethane	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Nitrobenzene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Isophorone	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2-Nitrophenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,4-Dimethylphenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
bis(2-Chloroethoxy)Methane	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,4-Dichlorophenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
1,2,4-Trichlorobenzene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Naphthalene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
4-Chloroaniline	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Hexachlorobutadiene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
4-Chloro-3-Methylphenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2-Methylnaphthalene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Hexachlorocyclopentadiene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,4,6-Trichlorophenol	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,4,5-Trichlorophenol	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
2-Chloronaphthalene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2-Nitroaniline	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
Dimethylphthalate	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Acenaphthylene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
3-Nitroaniline	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
Acenapthene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,4-Dinitrophenol	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U

Table A-5. Semivolatile Organic Compounds Analysis and Qualifier Summary. (sheet 4 of 6)

Sample Number: Units:	B07PZ8 µg/kg	B07PZ9 µg/kg	B07QO0 µg/kg	B07QO1 µg/kg	B07QO2 µg/kg	B07QO3 µg/kg	B07QO4 µg/kg	B07QO5 µg/kg	B07QO6 µg/kg	B07QO7 µg/kg
4-Nitrophenol	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
Dibenzofuran	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,4-Dinitrotoluene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
2,6-Dinitrotoluene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Diethylphthalate	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
4-Chlorophenyl-phenylether	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Fluorene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
4-Nitroaniline	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
4,6-Dinitro-2-methylphenol	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
N-Nitrosodipheylamine (1)	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
4-Bromophenyl-phenylether	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Hexachlorobenzene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Pentachlorophenol	810 U	920 U	820 U	860 U	860 U	830 U	860 U	820 U	810 U	800 U
Phenanthrene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Anthracene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Carbazole	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Di-n-Butylphthalate	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Fluoranthene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Pyrene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Butylbenzylphthalate	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
3,3'-Dichlorobenzidine	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Benzo(a)Anthracene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
bis(2-Ethylhexyl)Phthalate	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Chrysene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Di-n-Octyl Phthalate	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Benzo(b)Fluoranthene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Benzo(k)Fluoranthene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Benzo(a)Pyrene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Indeno(1,2,3-cd)Pyrene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Dibenz(a,h)Anthracene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U
Benzo(g,h,i)Perylene	340 U	380 U	340 U	360 U	350 U	340 U	360 U	340 U	330 U	330 U

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Table A-5. Semivolatile Organic Compounds Analysis and Qualifier Summary. (sheet 5 of 6)

Sample Number:	B07QO8	B07QO9	B07Q10	B07Q11	B07Q12	B07Q13	B07Q14	B07Q15	B07Q16
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Phenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
bis(2-Choroethyl)Ether	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2-Chlorophenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
1,3-Dichorobenzene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
1,4-Dichlorobenzene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
1,2-Dichlorobenzene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2-Methylphenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,2'-oxybis(1-Chloropropane)	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
4-Methylphenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
N-Nitroso-Di-n-Propylamine	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Hexachloroethane	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Nitrobenzene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Isophorone	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2-Nitrophenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,4-Dimethylphenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
bis(2-Chloroethoxy)Methane	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,4-Dichlorophenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
1,2,4-Trichlorobenzene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Naphthalene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
4-Chloroaniline	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Hexachlorobutadiene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
4-Chloro-3-Methylphenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2-Methylnaphthalene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Hexachlorocyclopentadiene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,4,6-Trichlorophenol	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,4,5-Trichlorophenol	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
2-Chloronaphthalene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2-Nitroaniline	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
Dimethylphthalate	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Acenaphthylene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
3-Nitroaniline	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
Acenapthene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,4-Dinitrophenol	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U

Table A-5. Semivolatile Organic Compounds Analysis and Qualifier Summary. (sheet 6 of 6)

Sample Number:	B07QO8	B07QO9	B07Q10	B07Q11	B07Q12	B07Q13	B07Q14	B07Q15	B07Q16
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4-Nitrophenol	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
Dibenzofuran	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,4-Dinitrotoluene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
2,6-Dinitrotoluene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Diethylphthalate	330 U	110 J	350 U	340 U	330 U	340 U	350 U	340 U	350 U
4-Chlorophenyl-phenylether	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Fluorene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
4-Nitroaniline	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
4,6-Dinitro-2-methylphenol	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
N-Nitrosodipheylamine (1)	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
4-Bromophenyl-phenylether	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Hexachlorobenzene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Pentachlorophenol	810 U	820 U	840 U	820 U	810 U	840 U	840 U	830 U	840 U
Phenanthrene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Anthracene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Carbazole	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Di-n-Butylphthalate	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Fluoranthene	330 U	340 U	350 U	340 U	330 U	100 J	350 U	340 U	350 U
Pyrene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Butylbenzylphthalate	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
3,3'-Dichlorobenzidine	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Benzo(a)Anthracene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
bis(2-Ethylhexyl)Phthalate	330 U	340 U	350 U	340 U	330 U	36 J	350 U	340 U	350 U
Chrysene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Di-n-Octyl Phthalate	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Benzo(b)Fluoranthene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Benzo(k)Fluoranthene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Benzo(a)Pyrene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Indeno(1,2,3-cd)Pyrene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Dibenz(a,h)Anthracene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U
Benzo(g,h,i)Perylene	330 U	340 U	350 U	340 U	330 U	340 U	350 U	340 U	350 U

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ATTACHMENT 1

JOINT LETTER FROM REGULATORS

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RECEIVED
MAR 12, 1992
T.B. VENEZIANO

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

March 4, 1992

Mr. Steven H. Wisness
Hanford Project Manager
U.S. Department of Energy
P.O. Box, 550 A5-19
Richland, WA 99352

Re: Expedited Responses Action Planning Proposals and Implementation

Dear Mr. Wisness:

On January 22, 1992, a meeting was held to discuss the selection of new Expedited Response Actions (ERA). The Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) assumed the task of identifying candidate sites for planning proposal preparation, and identification of lead regulatory agency.

The primary reasons to perform ERAs are to minimize or eliminate the potential for release of hazardous substances and/or radionuclides in the environment and to initiate actions consistent with anticipated remedy selections. The final remedy selection would be made after completion of a Remedial Investigation/Feasibility Study (RI/FS) or a RCRA Facility Investigation/ Corrective Measures Study (RFI/CMS).

On December 12, 1991, a meeting was held to discuss selection of new ERAs. In this meeting, the U.S. Department of Energy (DOE) and Westinghouse Hanford Company (WHC) provided EPA and Ecology with a list of twenty-two (22) candidate sites. In addition, DOE and WHC were seeking approval to proceed with EE/CA preparation for the 300 Area Burial Grounds. Based on this meeting and a continuing dialogue between Ecology, EPA, DOE, and WHC, four (4) sites from the candidate list have been selected for planning proposal preparation. In addition, we request DOE submit planning proposals for two additional sites that were drafted previously for DOE, but as yet have not been submitted to Ecology and EPA.

Ecology and EPA prefer to delay initiation of an ERA on the 300 Area Burial Grounds. With the use of test pits in both the liquid disposal sites and the burial grounds, it appears the schedule for completion of RI/FS activities in 300-FF-1 may be accelerated. In addition, treatability tests planned for this year may identify appropriate means for remediating contaminated sediments from the liquid disposal sites as well as the burial grounds. Early completion of these investigations could result in a final Record of Decision for the 300-FF-1 Operable Unit earlier than projected. Ecology and EPA prefer this course of action because it would potentially eliminate the need to handle waste from the burial grounds twice (once as part of the ERA and again as part of the final remedy).

Ecology and EPA have selected the following four sites for planning proposal preparations:

Sodium Dichromate Barrel Disposal Landfill in 100-IU-4 Operable Unit

The sodium dichromate barrel disposal site in the 100-IU-4 Operable Unit was selected in part due because this is the only facility located within the 100-IU-4 Operable Unit. Also, early remedial action at this operable unit may abate the potential of more extensive environmental degradation. Any ground water contamination from the sodium dichromate barrel site would be addressed as part of the 100-HR-3 Operable Unit. Removal of drums and contaminated sediments from this site may completely remediate the 100-IU-4 Operable Unit or may result in a no further action record of decision. This ERA would be designated as an Ecology lead site due to its location within the 100-HR-3 ground water operable unit for which Ecology is also the lead regulatory agency. An ERA at the sodium dichromate barrel disposal site should not require extensive planning or characterization prior to initiation and therefore field work should begin in fiscal year 1992.

U.S. Bureau of Reclamation 2,4-D Burial Site in 100-IU-3 Operable Unit

The U.S. Bureau of Reclamation 2,4-D burial site in the 100-IU-3 Operable Unit was also selected in part because it is the only documented hazardous waste disposal area located north of the Columbia River on the Hanford Site. In addition, this site is one of the few waste sites where DOE does not control access. Removal of drums and contaminated sediments from this site could eliminate the primary source of hazardous waste from this part of the Hanford Site and enhance public safety. The north slope area of the Hanford Site has been of particular interest to Ecology due to public access and the existing lease agreement between DOE and the Washington State Department of Fish and Wildlife. Ecology would be designated lead regulatory agency for both this ERA and the 100-IU-3 Operable Unit.

White Bluffs Pickling Acid Crib in 100-IU-5 Operable Unit

The White Bluffs pickling acid crib in the 100-IU-5 Operable Unit represents a significant source of acidic metal waste solution. This waste was generated from the final cleaning of reactor cooling pipes prior to installation in Hanford's eight single-pass reactors. These liquid disposal sites are located approximately one mile west of the 100-F Area near the old White Bluffs town site. Again, this site represents the primary source of contamination within the 100-IU-5 Operable Unit and a removal action at this facility will likely limit

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March 4, 1992
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the need for and extensive investigation through an RI/FS. Since little is known about the extent of contamination associated with the White Bluffs pickling acid crib, some degree of characterization will likely be required as part of an ERA at this site. Due to its location upgradient of 100-F Area, EPA would be designated as lead regulatory agency for both this ERA and the 100-IU-5 Operable Unit.

100-IU-1 River Rail Wash Pit and 600 Area Army Munitions Burial Site

The 100-IU-1 operable unit contains two units. The riverland railroad car wash pit was decontaminated in 1963, and subsequently released from radiation zone status. Site records indicate that all items were removed from the munitions burial site in 1986. These sites are both located west of Highway 240 and lack the access controls present at nearly all other past practice sites at Hanford. EPA will be lead agency for this ERA and the 100-IU-1 Operable Unit. This presents the potential opportunity to reach a decision to take no further action at an operable unit after performing a confirmatory investigation. We expect that the entire investigation could be done as part of the ERA. If that is the case, the ERA would be followed by administrative steps to reach a final ROD.

Planning proposals for two additional sites are already drafted, but not released. These are for the 100 Area river outfall pipes and the 618-11 burial ground. These planning proposals should be transmitted to Ecology and EPA without delay. The regulatory lead agency will be identified for these proposals in the notice to proceed with EE/CA preparation.

Should you have any questions about the selection of candidate sites for planning proposal preparation or implementation, please contact either Steve Cross of Ecology (206) 459-6675 or Doug Sherwood of EPA (509) 376-9529.

Sincerely,

Paul T. Day
Hanford Project Manager
EPA Region 10

David B. Jansen, P.E.
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cc: T. Veneziano, WHC

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